#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

# (19) World Intellectual Property Organization International Bureau



### 

#### (43) International Publication Date 15 July 2004 (15.07.2004)

#### PCT

## (10) International Publication Number WO 2004/059138 A1

(51) International Patent Classification<sup>7</sup>: F02G 5/02, H01L 35/00

F01N 5/02,

(21) International Application Number:

PCT/IB2003/006162

(22) International Filing Date:

23 December 2003 (23.12.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2002-377862

26 December 2002 (26.12.2002) J

2003-002338 8 January 2003 (08.01.2003) 3 (71) Applicant (for all designated States except US): TO

- (71) Applicant (for all designated States except US): TOY-OTA JIDOSHA KABUSHIKI KAISHA [JP/JP]; 1, Toyota-cho, Toyota-shi, Aichi-ken 471-8571 (JP).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MURATA, Kiyohito [JP/JP]; c/o Toyota Jidosha Kabushiki Kaisha, 1,toyota-cho, Toyota-shi, Aichi-ken 471-8571 (JP).

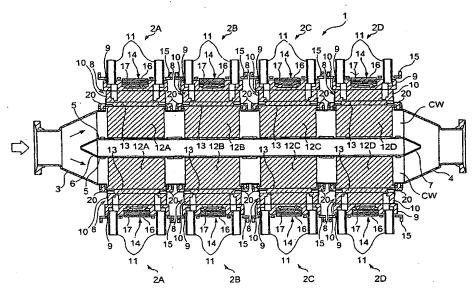
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: EXHAUST HEAT POWER GENERATION APPARATUS



(57) Abstract: An exhaust heat power generation apparatus (1) includes a heat exchange unit (12) that conducts thermal energy of exhaust gas flowing through an exhaust pipe, a cooling unit, (8) and a thermoelectric converting unit (12) thermoelectric converting module. (13) The cooling unit (8) has the highest rigidity among those of elements that constitute a system through which the thermal energy in the exhaust heat power generation apparatus. (1) A base of the heat exchange unit (12) has the highest rigidity among those of a main body of the exhaust pipe (5) and the heat exchange unit (12) both of which form an exhaust passage. The thermoelectric converting unit (12) is fixed by means of an elastic member (14) as a spring clamp that applies pressure externally to the cooling unit (8).

004/050138 A1 ||||||